DEPARTMENT OF LAND RECORDS AND AGRICULTURE, BENGAL.

ANNUAL REPORT

OF THE

SIBPUR EXPERIMENTAL FARM

FOR

1894-95.

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1. *Brief history.*—The Sibpur Farm was established towards the close of the year 1887, with the ultimate object of attaching to it an agricultural educational institution, but no action has as yet been taken in the proposed direction. It has been carried on since then with the object of testing the value of different crops, manures and implements.

The Farm consists of 26 acres of land adjoining the Government workshops at Sibpur.

The soil of the Farm is a heavy, alluvial loam; it had remained fallow for many years before the Farm was established, and was found to be overgrown with *kus* grass and other jungle. Much of the surface soil appears to be composed of earth dug from tanks and jhils, and is believed, therefore, to be of variable composition. For irrigating the Farm, water is obtained from a jhil which communicates with the river Hooghly. The immediate management of the Farm is in the hands of an Overseer, who works under the directions of one of the Assistant Directors of Agriculture. It is maintained at the expense of Government.

2. *Meteorology and character of the season.*—The amount and distribution of rainfall during the year under report are shown in the following statement:—

Month.	Rainfall.		Number of rainy days.	
	Normal.	1894-95.	Normal.	1894-95.
1	2	3	4	5
April 1894	1·81	3·47	3·05	4
May ,, ...	5·42	3·00	7·32	5
June ,, ...	10·37	10·23	12·40	18
July ,, ...	13·44	11·34	19·00	18
August ,, ...	13·51	4·82	18·40	16
September ,, ...	9·91	6·52	13·40	15
October ,, ...	4·42	4·41	5·90	12
November ,, ...	0·33	3·04	0·95	4
December ,, ...	0·35	0·08	0·60	Nil
January 1895	0·72	Nil	0·84	Nil
February ,, ...	1·47	0·02	2·05	Nil
March ,, ...	1·69	0·18	2·26	1

The figures of rainfall given above are taken from the returns for Alipur (as recorded by the Meteorological Reporter to the Government of India). The year under review was characterised by scanty rainfall. The deficient fall of the monsoon period does not seem to have affected the crops of the Farm, but the *rabi* crops, especially *barley* and *oats*, suffered for want of rain.

3. *Work of the Farm.*—The work done on the Sibpur Farm during the year 1894-95 may be divided under the following heads:—(1) experiments with manures; (2) use of new and improved implements; (3) experiments with new methods of cultivation; (4) experiments with new crops and new varieties of existing crops; (5) conservation of cow-dung.

(1) Experiments with manures.

Two manure experiments were made—one to test the value of green-manuring and castor-cake for potatoes, and the other to test the value of crude saltpetre and castor-cake for cabbage—

(*a*) *Potatoes.*—The experiment first-named was started in the year under report, and will be continued for a number of years. A piece of land was specially prepared for the experiment by levelling and cropping it for two years without any manure, care being taken to make it uniform in quality throughout. It was divided into eight equal plots of one-tenth acre each, three of which were green-manured with *dhainche* (*Sesbania aculeata*), three manured with castor-cake at the rate of 18 maunds per acre, and two were manured both with green *dhainche* and castor-cake at the rate abovementioned. The green-manured plots were ploughed thrice before sowing, the first ploughing being given in the last week of April. The plots were then left untouched till the second week of August, when the *dhainche* plants, which had then attained a height of about six feet, were ploughed in. It was found necessary to give eight ploughings after this before the land was ready for sowing. The seed tubers were sown in the last fortnight of November. The plots which received green manure and castor-cake were treated similarly up to this period, with the exception that castor-cake was applied to them at the time of sowing at the rate of nine maunds per acre, nine more maunds being applied at the time of the first earthing in December. The castor-cake plots received the same number of ploughings as the other contrasted plots in the experiment up to the time of sowing *dhainche*. After this period and up to the time of sowing, ten additional ploughings were given to these plots. The manure was applied at the rate of 18 maunds per acre, half of this quantity being given at the time of sowing, and the other half in December, when the potato plants were earthed for the first time. The crops in all the plots were earthed twice and irrigated four times. They were harvested in the month of March.

The average outturn of potatoes per acre in each case was as follows:—

	Outturn per acre. lbs.
Green-manure and castor-cake	9,239
Ditto alone	7,550
Castor-cake alone	7,992

It would appear that green-manuring with *dhainche* gave a smaller outturn than an application of castor-cake at the rate of 18 maunds per acre. Again, by adding castor-cake to the green-manure, a larger yield

was obtained than from the use of either of the manures applied singly. The experiment is one which requires to be repeated for several years before any conclusion can be safely drawn.

(*b*) *Cabbages.*—The experiment with cabbages was initiated in the year 1892-93, and continued during the year under report, when two plots each $\frac{1}{8}$ acre in area were laid under the experiment. Each of these plots was divided into two equal halves—one of which was manured with crude saltpetre at the rate of 12 maunds per acre, and the other with castor-cake at the rate of 30 maunds per acre; the land was ploughed up in May. In one plot, seven ploughings were given, and in the other which had to be sown later on account of the fall of rain immediately after the sowing of the first plot, ten ploughings were necessary. The seed was sown first of all in a nursery bed in September, and the seedlings transplanted in November. The castor-cake plots were manured twice, viz. at the time of transplanting and at the time of the first earthing. The saltpetre plots were also dressed twice after transplanting. The crop was ready for harvesting in January. The average outturn per acre obtained was 27,401 lbs. of cabbage from the two plots manured with saltpetre, and 29,376 lbs. of cabbage from the two castor-cake plots, thus showing a difference in the outturn of 1,975 lbs. per acre. The outturn in both cases was satisfactory, showing the usefulness of both saltpetre and castor-cake as manures for the cabbage crop. The usefulness of crude saltpetre as a manure for cabbage had been also demonstrated by experiment in the years 1892-93 and 1893-94. Several raiyats cultivating in the neighbourhood of the Farm were induced last year to use this manure for cabbages and other English vegetable crops, and expressed themselves to be well pleased with the result. In all likelihood, they will again use it this year.

(2) Use of new and improved implements.

Besides the Sibpur plough, which is in constant use on the Farm, the only new implement tried last year was the "Planet Jr." American hoe. It was found very useful in lightly stirring up and clearing weeds in the spaces left between rows of such crops as *reana* and guinea grass.

(3) Experiments with new methods of cultivation.

These were (*a*) to compare deep with shallow cultivation for jute, maize and barley; (*b*) to compare the method of planting potatoes in double rows as prevails in North Bengal with the method of planting them in single rows as obtains in Central Bengal and Bihar; and (*c*) to ascertain the capability of the *khari* variety of sugarcane for purposes of *ratooning*—

(*a*) *Jute, maize and barley.*—The jute and maize crops in the experiment with deep *versus* shallow cultivation failed through want of rainfall, and perhaps through defective tillage. The crop of barley which followed jute in the plots under deep and shallow cultivation also gave a very poor outturn per acre, owing, it is believed, to the entire absence of rainfall during the last cold weather. After the harvesting of the

crops in the jute plots which had been deep-ploughed twice, the land received no further ploughings till the 13th September. After this date, six more ploughings were given, and the seed was sown on the 14th November at the rate of 36 seers per acre. The after-treatment of the crop consisted of one weeding and one hoeing, and it was harvested in the month of April with the result given above.

(*b*) *Potatoes.*—The experiment in the method of planting potatoes in double and single rows was opened in the previous year. It was made in duplicate in four plots about $\frac{1}{10}$ acre each, two of which were planted in double rows, the sets being placed in two parallel lines, six inches apart, the distance between the furrows being three feet; the other two plots were planted in single rows as usual, the distance between the furrows being two feet. The former naturally required one-third more seed-potatoes than the latter. The crops of 1894-95 were sown in November and harvested in March after a period of four months. Altogether 11 ploughings were given to the land. The crops were earthed twice and irrigated four times. Castor-cake was applied to all the plots at the rate of 36 maunds per acre. The results obtained in 1893-94 and 1894-95 are given in the following statement:—

	Average outturn of potatoes per acre.	
	1893-94.	1894-95.
	lbs.	lbs.
Double rows	13,267	12,707
Single rows	10,374	9,967

It will be seen planting in double rows increased the yield by 2,740 lbs. per acre in the year under report, and by 2,893 lbs. per acre in 1893-94, due evidently to the use of a larger quantity of seed. The double row of planting was, however, found less profitable from a financial point of view than the method of planting in single lines.

(*c*) *Sugarcane.*—The experiment in *ratooning* the *khari* variety of sugarcane was in continuation of the experiment begun four years ago. A small plot of land measuring 2½ cottahs ($\frac{1}{24}$ acre) was planted with *khari* sugarcane in the year 1891-92. The fourth crop after planting was reaped last year, yielding an outturn of jaggery amounting to 4,742 lbs. per acre. The yields of jaggery in the successive years have been as follows:—

	Outturn per acre.
	lbs.
1891-92	4,169
1892-93	5,678
1893-94	4,555
1894-95	4,742

Fresh shoots have again come up from the shoots of the fourth crop, and promise to yield a good outturn this year. It remains to be seen for how long the crop can be grown successfully. The results above-stated fully bear out the experience gained in the Burdwan Farm from a similar experiment with the *khari* variety of sugarcane.

To put the *ratooning* qualities of *khari* cane to a more thorough test, a large area on the Farm, 2⅝ bighas, has been planted with this crop during the last two years. A portion of it now bears the third crop, and the remainder the second crop after planting. Last year a satisfactory outturn, amounting to nearly 4,320 lbs. per acre, was obtained from a part of this area, and the crop on the 10 cottahs was sold standing to an agriculturist for Rs. 50, thus fetching an income of Rs. 300 per acre.

It may be noted here that although the *khari* variety of sugarcane is far better adapted for *ratooning*, grows more freely and resists drought and insect pests far better than any other variety known in Lower Bengal, it suffers from two disadvantages which ought not to be lost sight of,—first, that the jaggery from *khari* sugarcane has a slightly saline taste, and is not so well suited for the manufacture of refined sugar as jaggery from the *samsara* variety which is preferred to all others for that purpose, and second by *ratooning* the canes gradually get harder every year, thus rendering the task of crushing the canes more difficult and expensive.

(4) Experiments with new crops and new varieties of existing crops.

The new crops and varieties tried were oats, several kinds of fodder grasses, and some varieties of tobacco new to Bengal.

Oats.—Oats have been successfully grown at the Sibpur Farm since 1889-90. Last year it was cultivated on a large area (12 bighas 3 cottahs); no manure was applied, and the crop suffered somewhat from want of rainfall during the last cold weather. Previous to 1894-95, the crop was grown as a grain crop, but last year the larger portion of the area (10 bighas 3 cottahs) under oats was cut in a green state for hay, and the remainder (2 bighas) reaped for grain and straw. The outturn of hay from the area cut green was at the rate of 3,456 lbs. per acre. The outturn of the area reaped for grain and straw when ripe was at the rate of 975 lbs. of grain and 1,096 lbs. of straw per acre. Considering the character of the season, the yield was fairly satisfactory. The average outturn of oats in the Sibpur Farm during the past four years has been as follows:—

	Average outturn of oats per acre.
	lbs.
1891-92	1,631
1892-93	1,687
1893-94	821
1894-95	975

The hay produced on the Farm last year was of an excellent quality, and the bulk of it was purchased at Re. 1-8 per maund by Captain Gunn for the Veterinary Hospital at Belgatchia.

Fodder grasses.—The fodder grasses cultivated last year were *sorghum*, *reana* and guinea grass. *Sorghum* and *reana* have been

grown for many years on the Farm, and found to yield a profitable outturn. Last year *sorghum* was grown on a small area (15 cottahs), and the yield of grass in two cuttings amounted to 16,893 lbs. per acre. *Reana* was raised on 10½ cottahs of land; it yielded three cuttings, the outturn amounting to 19,621 lbs. per acre. An area of 12½ cottahs was newly planted during the year with guinea grass. The crop shows a vigorous growth, and promises to yield a heavy outturn for several years. The whole of the fodder raised on the Farm was fed to farm cattle.

Tobacco.—An account was given in the annual reports of the Sibpur Farm for 1892-93 and 1893-94 of the experiments made in those years to ascertain if several exotic varieties of tobacco could be profitably grown in Bengal, and if by means of proper curing they could be utilised for cigar making. The report also contained a brief description of the character of each variety so far as it could be judged from its appearance in the field. The varieties grown last year were *hingli*, *Havana*, two varieties from Baroda, *Dindigal* and *Randrath's*. Of these *hingli* is the only variety grown in parts of Lower Bengal; the rest are all new to it. The crop yielded a fairly good outturn; but as the leaves are still in the process of curing, the outturn cannot be exactly stated, nor can anything be said about the quality of each variety. It is intended to submit a sample of each variety to an expert for valuation. It will be seen on reference to the annual report of the Sibpur Farm for 1893-94, that the opinion then expresssd by an expert as to the value of *Havana* and *hingli* tobacco gave ground for hope that with care exercised in curing and fermentation, tobacco suitable for the manufacture of cigars and cigarettes could be produced in Lower Bengal.

(5) Conservation of cowdung.

Much attention has been devoted since 1892-93 in the Farm to the proper conservation of cattle manure. An experiment was undertaken last year to ascertain the quantity and quality of manure produced by a given number of bullocks in a year. For this purpose, the food given to the bullocks, as well as the dung and urine voided by the farm cattle, were daily weighed for a period of six months, from the 1st May to the 31st October 1894. The excrements were voided during the time that the cattle were kept in the shed, *i.e.*, for about 12 hours every day. The excrements after weighment were deposited in a masonry pit, and once in a week the contents of the pit were pressed down with the feet in order to prevent the loss of moisture as far as possible. It was found that the five farm bullocks produced in six months about 115 maunds of dung and 27 maunds of urine. These quantities, together with 17 maunds of refuse, in all 159 maunds fodder, were deposited in the pit. About six months after the close of the experiment, the contents of the pit were again weighed, and it was found that the 159 maunds of raw dung, urine and refuse fodder had been reduced to about 71 maunds by loss of moisture and decomposition. From the figures given above, it would appear that a well-fed bullock would produce in a year about 46 maunds of dung weighed in a raw state and 11 maunds of urine.

These, together with the remains of the fodder, would yield about 28½ maunds of well-rotten manure after having been allowed to lie for nearly six months.

Receipts and expenditure of the Farm.—The gross expenditure of the Farm last year amounted to Rs. 2,590-15-2 against Rs. 2,433-12-9 in the previous year. The receipts amounted last year to Rs. 981-8-8 against Rs. 1,013-9-9 in 1893-94. A sum of Rs. 1,388-13-3 was incurred as the actual cost of cultivation, out of which Rs. 882-11-6 was realised by sale-proceeds of Farm produce. The net cost of maintaining the Farm last year was Rs. 1,609-6-6 against Rs. 1,420-7 in the previous year.

N. N. BANERJEI,

Asst. Director of Agriculture, Bengal.

CALCUTTA,
The 17th October 1895.

NOTE.—Mr. Bhupal Chandra Basu, Assistant Director, who was in charge of the Farm during the year, has been ill since the end of the year, and is now on leave. The above report has accordingly been written by another officer of the Department, and is partly based on notes written by Mr. Basu.

W. C. MACPHERSON,

Director of the Department of Land Records and Agriculture, Bengal.

The 17th October 1895.

E. J H.—Reg. No. 3153J—600—11-11-95.